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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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KUBOVCIK & KUBOVCIK
SUITE 1105
1215 SOUTH CLARK STREET
ARLINGTON, VA 22202

EXAMINER

ONEILL, KARIE AMBER

ART UNIT

PAPER NUMBER

1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,655	Applicant(s) TODE ET AL.	
	Examiner Karie O'Neill	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on November 10, 2008, was received. Claims 1 and 3 have been amended. Claim 4 has been cancelled. Claims 13-16 have been added as new. Therefore, Claims 1-3 and 5-16 are pending in this office action.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 6 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim is indefinite because the limitation that the "transition metal complex oxide is represented by the chemical formula: $\text{Li}_a\text{Mn}_x\text{Ni}_y\text{Co}_z\text{O}_2$ " does not have the required elements of the independent claims, which require that zirconium is present in "an amount of 0.1% to 5%, based on a total amount of said transition metals".

Claim Rejections - 35 USC § 102

4. The rejection of Claims 1, 6 and 7 under 35 U.S.C. 102(e) as being anticipated by Nakane et al. (US 2003/0180620 A1), has been overcome based on the arguments presented on pages 7-9 of the Remarks dated November 10, 2008.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Okabe et al. (JP 2003-031219).

With regard to Claim 1, Okabe et al. discloses a non-aqueous electrolyte secondary battery which has a positive electrode containing a positive active material, a negative electrode containing a negative active material and a non-aqueous electrolyte solution (paragraphs 0006 and 0016), said secondary battery being characterized in that said positive active material comprises a lithium transition metal complex oxide containing at least Ni and Mn as transition metals and having a layered structure (paragraph 0027) and comprising, in addition to said at least Ni and Mn, zirconium in the amount by mole of from 0.1% to 5 %, based on the total amount of said transition metals. The positive active material contains a compound represented by the formula $\text{Li}_{1+a}\text{Mn}_x\text{Ni}_y\text{Co}_z\text{M}_b\text{O}_2$, wherein M is an element other than Li, Mn, Ni, or Co, and $0 \leq a \leq 0.1$, $-0.1 \leq x-y \leq 0.1$, $y \leq x+z+b$, $0 < z \leq 0.4$, $0.3 \leq y$, $0.3 \leq x$, and $x+y+z+b=1$. M can be any of a number of elements, including Zr, in an amount preferably 5% or $b \leq 0.05$ (paragraphs 0024-0026).

With regard to Claim 7, Okabe et al. discloses wherein said lithium transition metal complex oxide contains substantially the same amount of Ni and Mn. See Examples and paragraphs 0072, 0086 and 0090.

With regard to Claim 8, Okabe et al. discloses wherein said positive active material has a specific surface area of 0.3-1.5m²/g (paragraph 0028).

Claim Rejections - 35 USC § 103

7. The rejection of Claims 2, 3, 10 and 11 under 35 U.S.C. 103(a) as being unpatentable over Nakane et al. (US 2003/0180620 A1), has been overcome based on the arguments presented on pages 7-9 of the Remarks dated November 10, 2008.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (JP 2003-031219), as applied to Claims 1, 7 and 8 above.

Okabe et al. discloses the non-aqueous electrolyte secondary battery in paragraph 6 above, including a potential between 4.3V-3.0V (paragraph 0019), but does not disclose wherein said positive electrode in a fully charged state has a potential of at least 4.5 V (vs. Li/Li'), and wherein the content of zirconium is in the amount by mole of from 0.1% to 1%, based on the total amount of said transition metals. Okabe et al.

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discloses a non-aqueous electrolyte secondary battery with the electrode noted having zirconium in the amount from 0.1% to 5 % mole percent.

Based on the teachings of Okabe, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an electrode with a fully charged state with a potential of at least 4.5 V in order to provide a complete and fully charged battery cycle performance based on the materials disclosed. Further, it would have been obvious to one of ordinary skill in the art to use zirconium in the amount of 0.1% to 1% to improve the high charging and discharging performance, which would provide the positive electrode with the ability have a fully charged potential of at least 4.5 V. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See MPEP 2144.05.

10. Claims 3, 11, 12 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (JP 2003-031219).

With regard to Claims 3, 15 and 16, Okabe et al. discloses a non-aqueous electrolyte secondary battery which has a positive electrode containing a positive active material, a negative electrode containing a graphite material as a negative active material (paragraph 0041) and a non-aqueous electrolyte solution (paragraphs 0006 and 0016) and which is designed to be charged with an end-of-charge voltage of 3.0V-4.3V (paragraph 0019), said secondary battery being characterized in that said positive active material comprises a lithium transition metal complex oxide containing at least Ni and Mn as transition metals and having a layered structure (paragraph 0027) and

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comprising, in addition to said at least Ni and Mn, zirconium in the amount by mole of from 0.1% to 5 %, based on the total amount of said transition metals. The positive active material contains a compound represented by the formula $\text{Li}_{1+a}\text{Mn}_x\text{Ni}_y\text{Co}_z\text{M}_b\text{O}_2$, wherein M is an element other than Li, Mn, Ni, or Co, and $0 \leq a \leq 0.1$, $-0.1 \leq x-y \leq 0.1$, $y \leq x+z+b$, $0 < z \leq 0.4$, $0.3 \leq y$, $0.3 \leq x$, and $x+y+z+b=1$. M can be any of a number of elements, including Zr, in an amount preferably 5% or $b \leq 0.05$ (paragraphs 0024-0026).

Okabe et al. does not specifically disclose wherein the end-of-charge voltage is 4.4 V, and does not specifically disclose wherein the content of zirconium is in the amount by mole of from 0.1% to 1%, based on the total amount of said transition metals. However, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use an electrode with a fully charged state potential of at least 4.4 V in order to provide a complete and fully charged battery cycle performance based on the materials disclosed. Further, it would have been obvious to one of ordinary skill in the art to use zirconium in the amount of 0.1% to 1% to improve the high charging and discharging performance, which would provide the positive electrode with the ability have a fully charged potential of at least 4.5 V. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See MPEP 2144.05.

With regard to Claim 11, Okabe et al. discloses wherein said lithium transition metal complex oxide contains substantially the same amount of Ni and Mn. See Examples and paragraphs 0072, 0086 and 0090.

With regard to Claim 12, Okabe et al. discloses wherein said positive active material has a specific surface area of $0.3\text{-}1.5\text{m}^2/\text{g}$ (paragraph 0028).

11. Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okabe et al. (JP 2003-031219), as applied to Claims 1, 2, 3, 5, 7, 8 and 11-16 above, and in further view of Uemura et al. (US 2002/0012830 A1).

Okabe et al. discloses the non-aqueous electrolyte secondary battery in paragraphs 6 and 10 above, but does not disclose wherein a ratio in capacity of said negative electrode to said positive electrode (negative electrode/positive electrode) in their portions opposed to each other is in the range of 1.0 - 1.3.

Uemura et al. discloses a rechargeable lithium battery including a positive electrode with a positive active material made of a layered lithium manganese complex oxide, such as $\text{Li}_{2/3}\text{Mn}_{1/2}\text{Ni}_{1/2}\text{O}_2$ (paragraphs 0035 and 0041). Uemura et al. also discloses a capacity balance ratio B/A of the total capacity B of the negative electrode material to the total capacity A of the positive electrode material is preferably fixed at a range of 1 to 1.5.

Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to have a ratio capacity of said negative electrode to positive electrode in the range of 1.0-1.5 in the battery of Okabe et al., because Uemura et al. teaches that if the capacity balance ratio B/A is below 1, lithium ion holding sites on the negative electrode material become insufficient. As the result, branch-shaped or needle-shaped crystal (dendrite crystal) tends to occur during the charge to cause a short

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circuit phenomenon between the positive electrode and the negative electrode. If the capacity balance ratio B/A exceeds 1.5, negative electrode sites that do not contribute to the charge-discharge are increased, leading to the wasteful use of materials (paragraph 0033).

Response to Arguments

12. Applicant's arguments with respect to claims 1-3 and 5-12 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571)272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/
Primary Examiner, Art Unit 1795

/Karie O'Neill/
Examiner
Art Unit 1795

KAO

/Mark Ruthkosky/
Primary Examiner, Art Unit 1795